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(56) Documents Cited

**EP 0322599 A1 US 4497025 A US 4381829 A**

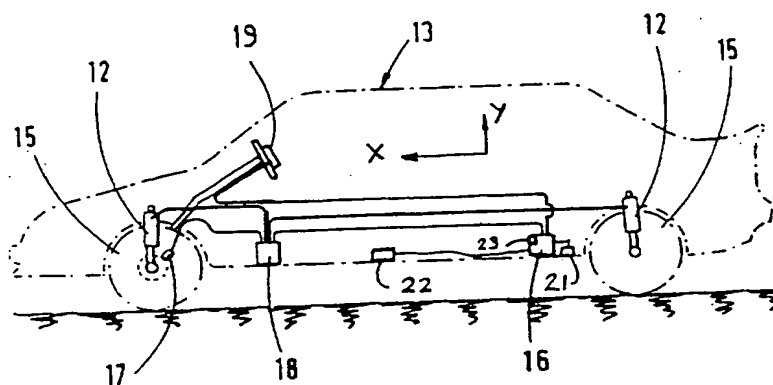
(58) Field of Search

**UK CL (Edition M) B7H HXB HXD, G4N NHVSC  
INT CL<sup>5</sup> B60K 28/14, B60R 21/00 21/32 22/46, G01P  
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Online database: WPI**

(54) Central acceleration measuring system for vehicles

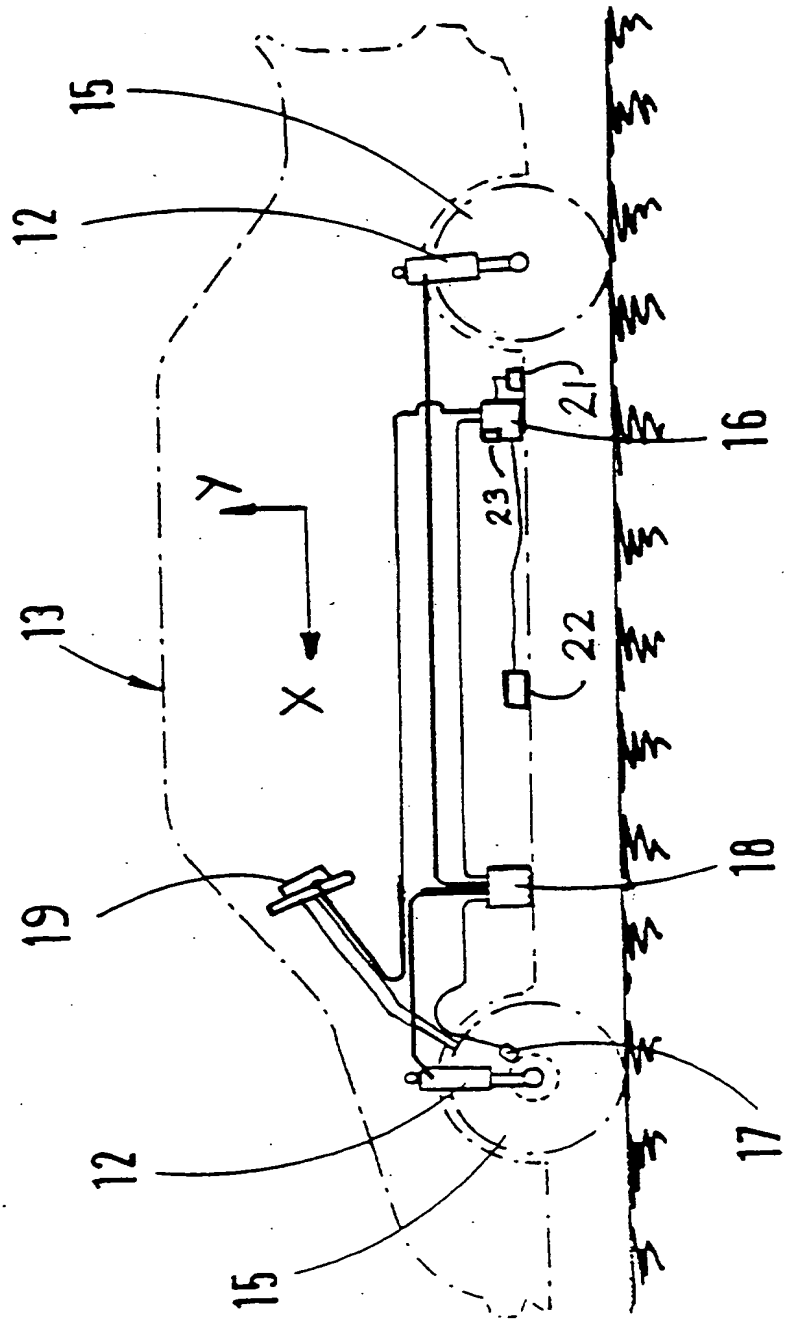
(57) A central acceleration measuring system is used to provide an indication of acceleration to more than one electrical sub-system of the motor vehicle, eg airbag deployment, crash fuel cut off, suspension control, traction control, crash door auto unlock or anti-lock braking.

Fig. 1



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Fig. 1



"A Motor Vehicle"

This invention relates to a motor vehicle and in particular to a motor vehicle having an acceleration measuring means.

It is known to provide a motor vehicle with a number of acceleration measuring systems to measure both vertical and horizontal movement of the vehicle, each acceleration measuring system being dedicated to one electrical sub-system of the motor vehicle such as airbag deployment, crash fuel cut off, suspension control, traction control, crash door auto unlock or anti-lock braking.

It is a problem with such prior art motor vehicles that the use of numerous acceleration measuring systems requires a considerable amount of duplication of equipment.

According to the invention there is provided a motor vehicle having a single acceleration measuring system to measure acceleration of the motor vehicle in at least one direction, the measuring system comprising of a signal processor unit to which is connected at least one acceleration sensing means, the signal processor unit being arranged provide at least one acceleration related signal to a plurality of electrical sub-systems of the motor vehicle.

There may be provided at least one acceleration sensing means attached to a part of the vehicle to sense acceleration in the normal direction of travel of the vehicle.

There may be provided at least one acceleration sensing means attached to a part of the vehicle to sense vertical acceleration.

There may be provided at least one acceleration sensing means attached to a part of the vehicle to sense acceleration in a

transverse direction with the respect to the normal direction of travel of the motor vehicle.

The or each acceleration sensing means may be an accelerometer. Advantageously, the or each accelerometer may be provided with integral signal processing.

At least one acceleration sensing means may be included as part of the signal processor unit.

The invention will now be described by way of example with reference to Figure 1 in which there is shown a motor vehicle having a body 13, a number of road wheels 15 and a number of shock absorbers 12 to provide a damped resilient connection between the wheels 15 and the body 13.

Each of the front road wheels 15 has a rotational speed sensing means 17 associated therewith to measure the rotational speed of each front wheel 15.

Each of the shock absorbers 12 is fitted with an electronically controlled valve means (not shown) to vary the characteristics of the shock absorber 12 in response to a signal from an electronic suspension control unit 18.

The suspension control unit 18 receives a signal from each of the speed sensing means 17 and also from a signal processor unit 16 of a central acceleration measuring system.

The acceleration measuring system includes the signal processor unit 16 and three acceleration detecting means in the form of accelerometers 21,22,23. The accelerometers 21,22,23 are arranged to detect acceleration of the motor vehicle in the normal direction of travel, as indicated by arrow X, vertical acceleration of the motor vehicle, as indicated by arrow Y, and acceleration in a transverse direction with respect to the normal direction of travel of the motor vehicle.

The accelerometers 21,22 used to detect acceleration in the normal direction of travel and vertical direction are remotely mounted with respect to the signal processor unit 16 but the accelerometer 23 used to measure transverse acceleration is formed as part of the signal processor unit 16. By incorporating the transverse acceleration measuring means as part of the signal processor unit 16 the susceptibility to interference is reduced.

The signal processor unit 16 acts so as to transform the data received from the accelerometers 21,22,23 into the required outputs for the sub-systems supplied by applying pre-determined transfer functions to the inputs to produce the required outputs.

The signal processor unit 16 is connected to the suspension control unit 18 and also to another electrical sub-system of the motor vehicle in the form of an electrically actuated gas generator of an airbag assembly 19. The signal supplied by the signal processor 16 to the suspension control unit 18 is used by the suspension control unit 18 to vary the characteristic of the shock absorbers 12.

The signal supplied by the signal processor 16 to the airbag assembly is used to energise the gas generator and hence inflate the airbag when one of the accelerometers 21,22,23 of the acceleration measuring system detects an acceleration beyond a predetermined limit.

It will be appreciated by those skilled in the art that the use of a single acceleration measuring system greatly reduces the duplication of electronic signal processing equipment and control means required by integrating the acceleration signal processing for several electrical sub-systems into one unit.

By integrating the acceleration signal processing for several electrical sub-systems it is also possible to more readily interrelate their functions so as to improve the operating efficiency of the vehicle.

It will also be appreciated by those skilled in the art that the positioning of the accelerometers forming part of the single acceleration measuring system will be chosen to provide the required signals for the sub-systems connected to the acceleration measuring system.

In addition each accelerometer may be provided with its own integral signal processing so that the signal provided to the signal processing unit 16 is a function of the sensed acceleration.

Claims.

1. A motor vehicle having a single acceleration measuring system to measure acceleration of the motor vehicle in at least one direction the measuring system comprising of a signal processor unit to which is connected at least one acceleration sensing means, the signal processor unit being arranged provide at least one acceleration related signal to a plurality of electrical sub-systems of the motor vehicle.
2. A motor vehicle as claimed in Claim 1 in which there is provided at least one acceleration sensing means attached to a part of the vehicle to sense acceleration in the normal direction of travel of the vehicle.
3. A motor vehicle as claimed in Claim 1 or in Claim 2 in which there is provided at least one acceleration sensing means attached to a part of the vehicle to sense vertical acceleration.
4. A motor vehicle as claimed in any of Claims 1 to 3 in which there is provided at least one acceleration sensing means attached to a part of the vehicle to sense acceleration in a transverse direction with the respect to the normal direction of travel of the motor vehicle.
5. A motor vehicle as claimed in any preceding Claim in which the or each acceleration sensing means is an accelerometer.
6. A motor vehicle as claimed in Claim 5 in which the or each accelerometer is provided with integral signal processing.
7. A motor vehicle substantially as claimed in any preceding Claim in which at least one acceleration sensing means is included as part of the signal processor unit.

8. A motor vehicle substantially as described herein with reference to the accompanying drawing.



**Relevant Technical Fields**

- (i) UK Cl (Ed.M) B7H (HXB, HXD) G4N (NHVSC)  
(ii) Int Cl (Ed.5) B60K 28/14; B60R 21/00, 21/32, 22/46; G01P 15/00

Search Examiner  
JOHN TWIN

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13 OCTOBER 1994

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-  
1 TO 8

(ii) ONLINE DATABASE: WPI

**Categories of documents**

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.  
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.  
A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
X	EP 322599 A1 (MAN)	1 at least
X	US 4497025 (RENAULT) see for example column 3 lines 1 to 30	1 at least
X	US 4381829 (RENAULT) see for example column 3, lines 54 to 60	1 at least

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).